A FUEL TANK AND METHOD OF MAKING SAME

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] This invention relates to fuel tanks made of a thermoplastic material.

2. Description of the Prior Art

[0002] The well known steel fuel tanks present problems with corrosion resistance to the many fuels used in automotive vehicles. It is also difficult to fabricate a steel fuel tank into a complex form desired by designers to efficiently utilize space in a vehicle.

[0003] Consequently, there has been a significant development in the fabrication of fuel tanks from plastic materials. Examples of such are disclosed in U.S. Patents 5,344,038 to Freeman et al, 5,384,172 to Takado et al and 6,305,568 to Suzuki et al.

[0004] Nonetheless, there remains a need for an improved fuel tank to increase the resistance to heat (fire) and to the effusion of hydrocarbons.

SUMMARY OF THE INVENTION AND ADVANTAGES

[0005] The subject invention provides a method of fabricating a heat and effusion resistant fuel tank with a material that combines a thermoplastic and amorphous silica to form a compound, heating the compound, and forming a hollow fuel tank.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Other advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein Figure **1** is a schematic showing the method of fabricating a component in accordance with the subject invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0007] Referring to Figure 1, a method of fabricating a heat and effusion resistant fuel tank is shown schematically.

[0008] The first step is the compounding or combining of a thermoplastic material **12**, such as a high-density polyethylene (HDPE), with amorphous silica **14** to form a compound. The thermoplastic **12** is in the form of granules and the amorphous silica **14** is in the form of a powder. Rice Chemistry Corporation sells the amorphous silica **14** under the trademark RICE/SIL-100 in a "powder-like form. The amorphous silica may be combined with the thermoplastic to form the compound by any one of several different methods including "filling" the thermoplastic with amorphous silica during the fabrication of the monomer or polymer resin or combining the amorphous silica with the resin after its manufacture. In the latter case the thermoplastic in its commonly supplied pelletized form would be heated until it reached a viscous state and the amorphous silica would be combined (mixed) with the viscous thermoplastic to form a viscous compound. This mixing process could take place in the "barrel" of a molding machine and the compound injected directly into a mold for the manufacture of a fuel tank or the mixing process

could take place in another mixing device and the compound would be further processed to a useable form. In the latter case the compound may be processed through an extruder, solidified and pelletized for example. The compounding may be accomplished in any suitable mixing apparatus such as an extruder **16**. The compound is heated into a viscous state in the extruder **16**. Actually, the thermoplastic **12** is heated by a heater **18** to a viscous state and the powered amorphous silica **14** is added to form a heated and viscous compound which is then extruded from the extruder **16** to form a strand **20**. As is well known, the strand is cooled into a solid that is subsequently chopped or cut into pellets **22**.

[0009] At some later time and perhaps at another location, the pellets **22** of the compound are poured from a container **24** into a molding machine **26**. The pellets **22** are heated in the molding machine **26**, as by a heater **28**, into a viscous paste. The viscous paste of the compound is injected through an injector **30** into a mold **32** for forming a hollow fuel tank **34**. The fuel tank is formed with a filler neck defining an opening **36,** the neck can be of any length for filling the tank with fuel. The filler neck **36** could be very short, and even a simple opening, and affixed to a longer entry tube (not shown).

[0010] The method may be further defined as heating the compound to a temperature of between 200 and 500 degrees Fahrenheit with the thermoplastic being heated to a viscous condition before adding the amorphous silica powder.

[0011] In one instance, the amorphous silica was 30% by volume of the compound.

[0012] Accordingly, the subject invention provides a heat and effusion resistant fuel tank comprising a hollow body having a filler neck or opening for

receiving fuel and consisting of a homogeneous thermoplastic filled with amorphous silica. The amorphous silica may be in the range of 10% to 50% of the fuel tank.

[0013] Obviously, many modifications and variations of the present invention are possible in light of the above teachings. The invention may be practiced otherwise than as specifically described within the scope of the appended claims.